Appl. No. : 09/705,569
Filed: 11/03/2000
Office Action Dated: 8/17/2004

Amendments to the Claims: This listing of claims will replace all prior version and listings of claims in the application.

Claims 1 and 3 are currently amended.

Claims 2 and 4-33 are original.

Claims

1. **(Currently Amended)** A method for ~~optimizing~~improving a drill bit assembly design for drilling a well bore section, comprising:

determining a range of operating parameter values for a drilling system to be employed to drill said well bore section,

determining characteristics of the formation along a trajectory through which said well bore section is to be drilled,

calculating a first rate of penetration through said well bore section for a first drill bit assembly design to be employed with said drilling system for drilling said well bore section, said calculated rate of penetration being determined as a function of calculating with operating parameter values within said range of operating parameter values,

modifying a depth of cut parameter of said first drill bit assembly design to provide a subsequent drill bit assembly design,

calculating a second rate of penetration through said well bore section for said subsequent drill bit assembly design to be employed with said drilling system for drilling said well bore section, said second rate of penetration for said subsequent drill bit assembly being determined as a function of applying operating parameters within said range of operating parameters, and

selecting a selected drill bit assembly design from said first and subsequent drill bit assembly designs having ~~a desired~~the calculated rate of penetration.

2. **(Original)** A method for improving a drill bit assembly design as defined in

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Claim 1, comprising repeating the steps of modifying a depth of cut parameter and calculating, for a subsequent drill bit assembly design, the rate of penetration through said well bore section until obtaining a selected drill bit assembly design having a calculated rate of penetration through said well bore section that is greater than said first calculated rate of penetration of said first drill bit assembly design through said well bore section.

3. (**Currently Amended**) A method as defined in Claim 1 further comprising building a drilling bit assembly having said selected drill bit assembly ~~sphere~~ design.

4. (**Original**) A method as defined in Claim 1 further comprising drilling said well bore section with a drilling bit assembly having said selected drill bit assembly design.

5. (**Original**) A method as defined in Claim 1 wherein said operating parameter values include torque values.

6. (**Original**) A method as defined in Claim 1 wherein said operating parameter values include torque and rate of revolution values.

7. (**Original**) A method as defined in Claim 1 wherein said operating parameter values include torque, rate of revolution and weight on bit values.

8. (**Original**) A method as defined in Claim 1 wherein said trajectory includes a curving section.

9. (**Original**) A method as defined in Claim 1 wherein said first calculated rate of penetration through said well bore section for a first drill bit assembly design is

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calculated using a computer modeling program.

10. (**Original**) A method as defined in Claim 9 further comprising:

determining a depth of cut verses predicted torque relationship for said selected drill bit assembly design using said computer modeling program, and

drilling said well bore section with a drilling bit assembly having said selected drill bit assembly design.

11. (**Original**) A method as defined in Claim 10, further comprising comparing the actual torque values encountered while drilling said well bore section with a drilling bit assembly having said selected drill bit assembly design with the predicted torque values in said depth of cut verses predicted torque relationship for evaluating a first characteristic of said formation.

12. (**Original**) A method as defined in Claim 11 wherein said first characteristic of said formation comprises the compressive strength of said formation.

13. (**Original**) A method as defined in Claim 11 wherein the torque values encountered when drilling said well bore section during a first rate of penetration are compared with the predicted torque values for said selected drill bit assembly design at a rate of penetration equal to said first rate of penetration.

14. (**Original**) A method as defined in Claim 13 wherein said first characteristic of said formation comprises a compressive strength of said formation.

15. (**Original**) A method as defined in Claim 11 further comprising predicting a characteristic of said formation by comparing said actual torque values and said

predicted torque values while drilling said well bore section.

16. (**Original**) A method as defined in Claim 15 wherein said predicted characteristic is formation compressive strength.

17. (**Original**) A method for matching a drilling bit assembly to a specific drilling application, comprising:

determining a range of system operating parameters for a drilling system to be employed to drill a well bore section through a selected medium,

selecting a basic drilling bit assembly design having a first set of bit characteristics,

using a computer modeling program to determine a first set of torque characteristics of a bit of the basic drilling bit assembly design going through the selected medium, said computer modeling program evaluating reaction torque in a bit of the basic drilling bit assembly design as a function of the characteristics of the selected medium, the weight on a bit of the basic drilling bit assembly design, the rate of rotation of a bit of the basic drilling bit assembly design and/or the rate of penetration of a bit of the basic drilling bit assembly design through the selected medium,

modifying a depth of cut characteristic of the basic drilling bit assembly design to produce a modified drilling bit assembly design with a greater depth of cut than the basic drilling bit assembly design, said modified bit assembly design being operable within said range of system operating parameters for said drilling system,

using said computer modeling program to determine a second set of torque characteristics of the modified bit assembly design,

expressing representations of depth of cut verses torque values for said basic drilling bit assembly design and said modified drilling bit assembly design, and

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selecting a drilling bit assembly design using information from the expression of the depth of cut verses torque values.

18. (**Original**) A method as defined in Claim 17 wherein said depth of cut characteristics are modified by changing a profile of said basic drilling bit assembly design.

19. (**Original**) In method as defined in Claim 17 wherein said depth of cut characteristics are modified by changing a blade design of said basic drilling bit assembly design.

20. (**Original**) A method as defined in Claim 17 wherein said depth of cut characteristics are modified by changing a cutter rake of a cutter of said basic drilling bit assembly design.

21. (**Original**) A method as defined in Claim 17 wherein said depth of cut characteristics are modified by changing a cutter configuration of said basic drilling bit assembly design.

22. (**Original**) A method as defined in Claim 17 wherein said depth of cut characteristics are modified to obtain the maximum rate of penetration for said modified drilling bit assembly design.

23. (**Original**) A method for optimizing the drilling of a well bore section, comprising:

determining a range of available operating capabilities including applied torque, speed of rotation and weight on bit for the drilling system to be used to drill said well

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bore section,

determining the physical characteristics of the formation through which said well bore section is to be drilled,

selecting a first basic bit design for use with said drilling system,

calculating the torque required to move a bit of said first basic bit design against said formation,

calculating the rate of penetration through said formation of a bit having said first basic bit design,

determining a depth of cut verses torque relationship for a bit having said first basic bit design penetrating said formation,

modifying a feature of said first basic bit design to provide a second bit design,

calculating the torque required to move a bit of said second bit design against said formation,

determining a depth of cut verses torque relationship for a bit of said second bit design, and

selecting from said depth of cut verses torque relationships for bits of said first and second bit designs, a bit design for use with said drilling system.

24. (**Original**) A method for optimizing the drilling of a well bore as defined in Claim 23 wherein said depth of cut verses torque relationships are derived in part from a computer analysis of said first and second bit designs.

25. (**Original**) A method for optimizing the drilling of a well bore as defined in Claim 24 wherein said computer analysis employs information regarding rate of bit penetration, formation hardness and rate of bit revolution to calculate the expected torque on a bit design.

26. (**Original**) A method for optimizing the drilling of a well bore as defined in Claim 24 wherein rate of penetration and rate of bit revolution are employed to calculate a depth of cut for said bit designs.

27. (**Original**) A method for optimizing the drilling of a well bore as defined in Claim 23 wherein said basic bit design is modified to produce a bit design having a greater depth of cut for a given torque than is produced by said basic bit design at said given torque.

28. (**Original**) A method for optimizing the drilling of a well bore as defined in Claim 23, comprising:

repeatedly modifying a feature to provide multiple bits of multiple bit designs,

repeatedly determining the torque required to move said bit of said multiple bit designs against said formation,

repeatedly determining a depth of cut verses torque relationship for said multiple bit designs, and

selecting a preferred bit design from said depth of cut verses torque relationships for said multiple bit designs for use with said drilling system.

29. (**Original**) A method as defined in Claim 23 further comprising determining the torque for multiple bit designs as a function of formations having different compressive strengths.

30. (**Original**) A method as defined in Claim 23 further comprising modifying said bit designs to obtain a bit design optimizing depth of cut with the least amount of torque.

31. **(Original)** A method as defined in Claim 23 further comprising modifying said bit designs to obtain a bit design producing an optimum rate of penetration for a well bore section having both a linear and a curved trajectory.

32. **(Original)** A method as defined in Claim 23 further comprising evaluating the formation compressive strength by monitoring the torque experienced during the drilling of said well bore section.

33. **(Original)** A method as defined in Claim 23 further comprising evaluating a characteristic of a first formation by comparing the torque encountered at a first rate of penetration of said first formation of a bit of said selected design with a predicted torque for a bit of said selected design operating at a depth of cut equivalent to said first rate of penetration.